Jan. 27, 1970 I. N. PLETT 3,491,986

SAFETY PACKAGE FOR MIXABLE MATERIALS

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Fig. 1.

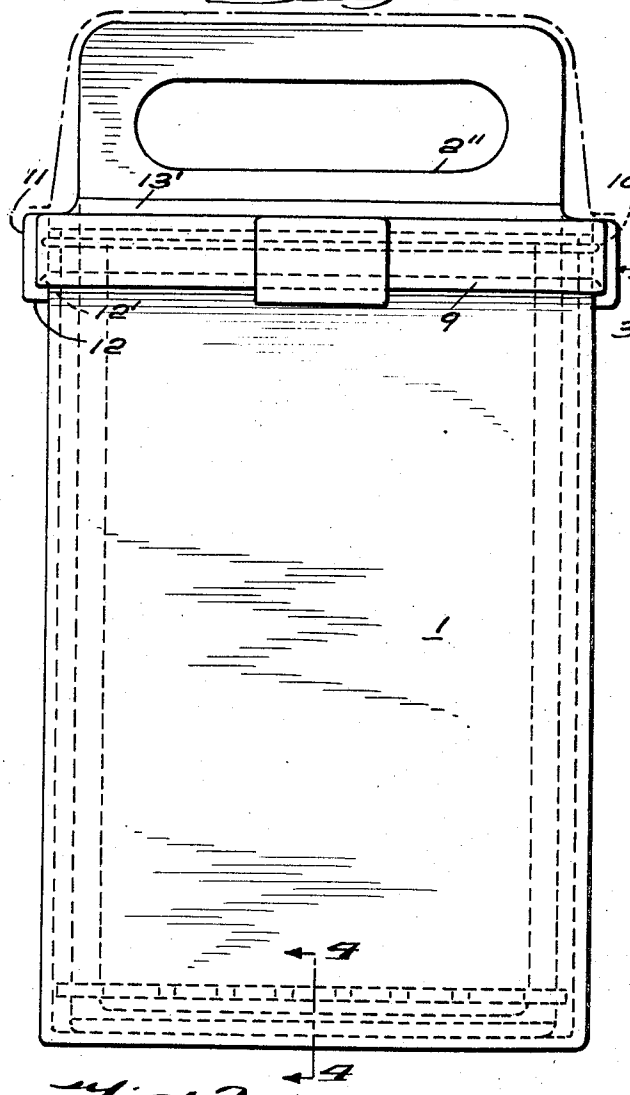


Fig. 3.

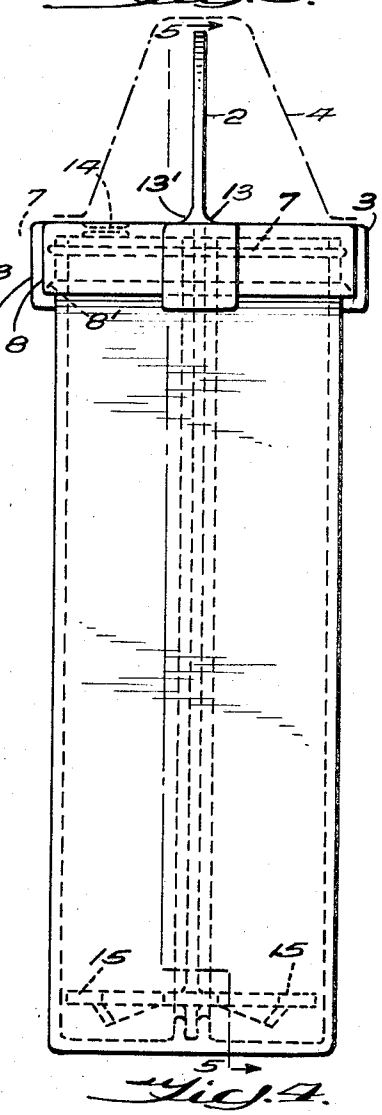


Fig. 2.

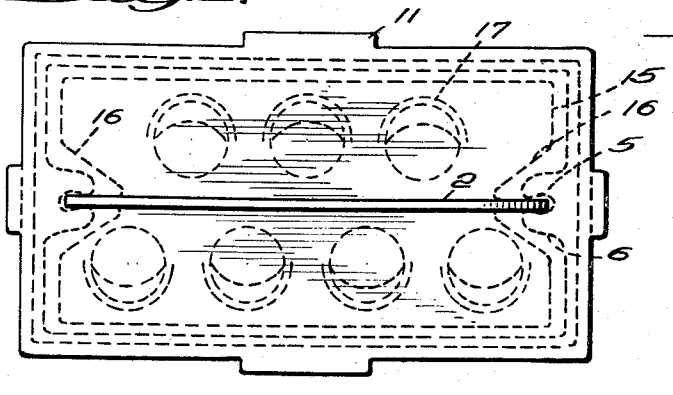
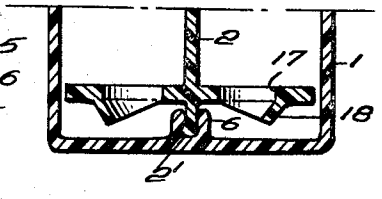


Fig. 4.



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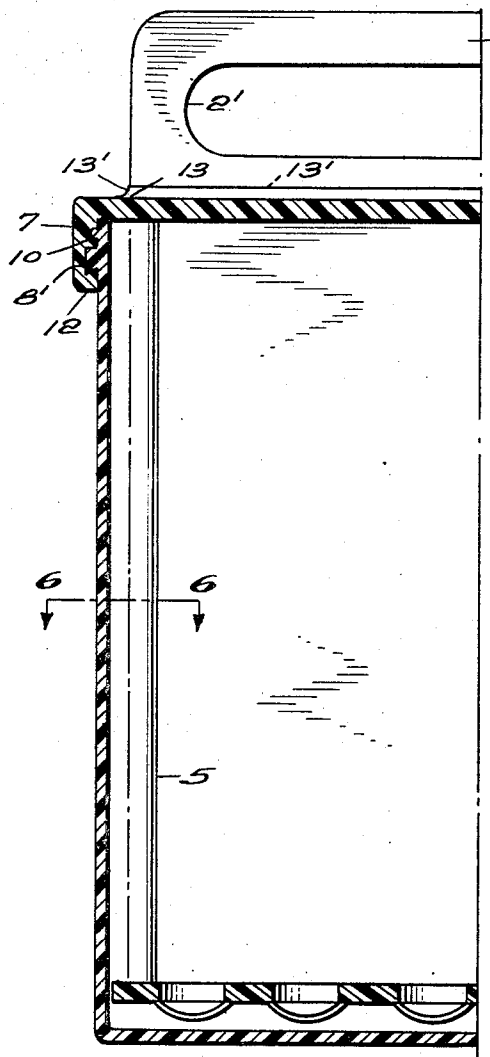


Fig. 5.

Fig. 6.

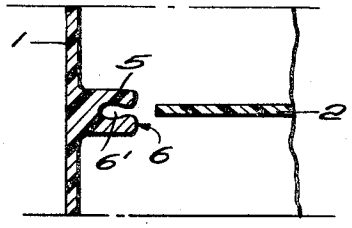


Fig. 4a.

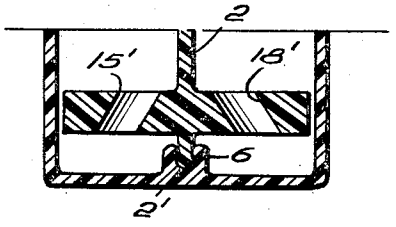
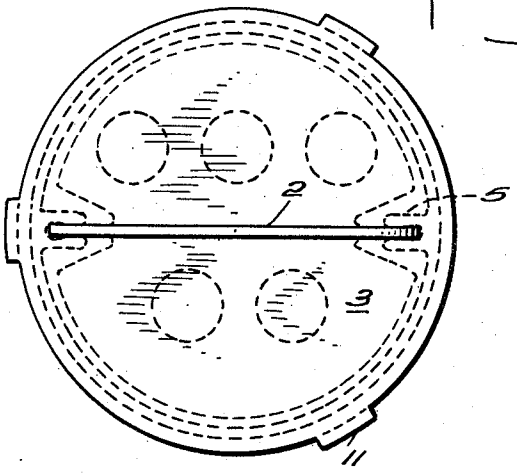


Fig. 7.



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Fig. 8.

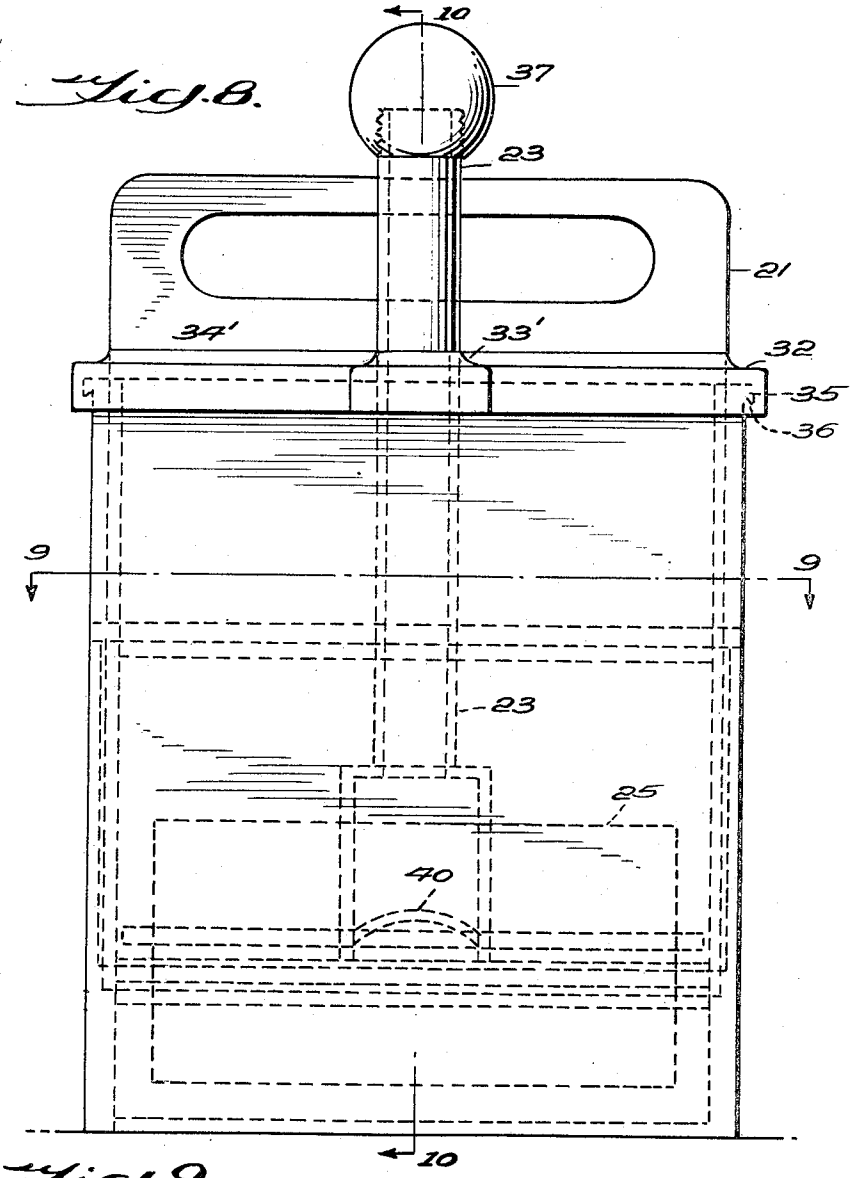
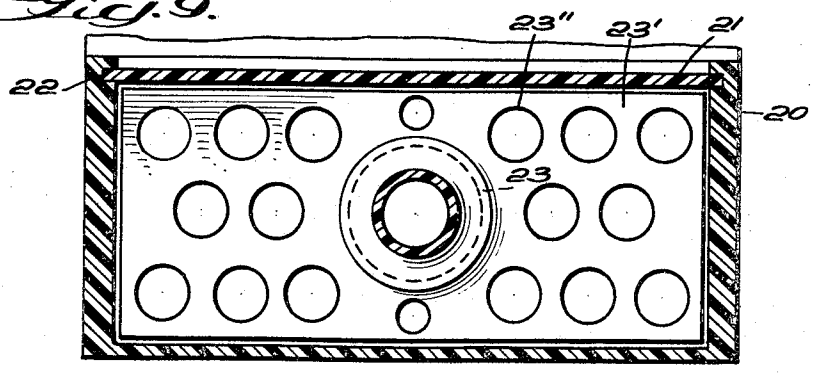


Fig. 9.



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Fig. 11

Fig. 10.

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SAFETY PACKAGE FOR MIXABLE MATERIALS

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U.S. Cl. 259—113 10 Claims

ABSTRACT OF THE DISCLOSURE

A special receptacle or safety package for two liquids such as an epoxy resin and a catalyst therefor which includes means that maintains the liquids in separated condition during transit or storage and which will upon reciprocation cause the liquids to admix and agitate the mixture.

The present invention relates broadly to the art of receptacles or packages which contain a plurality of liquid materials which are to be maintained separated until the time of use.

More particularly the invention relates to a safety receptacle or package for at least two liquid materials, at least one of which is toxic to the skin, that can be filled with the desired amounts of the materials in separated condition, which will maintain the materials separated during transit or transportation and which incorporates means for mixing the same within the receptacle when ready for use.

Still more particularly the invention relates to a container for resin-catalyst components in liquid form that will allow a person to avoid direct contact with the same in filling the container, permits transportation without leakage or mixing, and provides means for mixing the liquids internally of the container without the person coming in contact with the liquids when the mixture is to be used.

Containers or receptacles are known in the art which will maintain two or more materials to be mixed in separated condition until ready for use, however, in the plastics or resin field, epoxy resin and a catalyst or curing agent therefor are generally separately packaged and when ready for use, a separate amount of each component is withdrawn from its respective container and a mixture is formed. One example of such arrangement is the use of separate collapsible tubes to accommodate the components.

In commercial or industrial applications where it is desired to prepare a substantial volume of a resin-catalyst mixture, such as when an epoxy based paint or coating composition is to be used to coat a surface to render the same acid and alkali resistant, it is still customary to mix the resin, pigment, plasticizer and vehicle in one container and have the catalyst or curing agent in another container. When a coating operation is to be effected, a desired amount of the mixture has a required amount of curing agent added thereto and mixed therewith to provide the coating which is then applied to the surface to be coated.

In any of the foregoing arrangements, there are considerable opportunities presented for a person to come into direct contact with liquids that are toxic to the skin..

Accordingly, the present invention has for an object to provide a container or receptacle for at least two mixable liquids, such as an epoxy resin and a catalyst or curing agent therefor, which can accommodate the liquids in separate compartments for filling purposes, can transport the same in leakproof condition and when it is desired to use mixture of the two liquids, includes a reciprocable means that not only places the two liquids into mixing relation on contact with one another but also stirs or agitates the admixed liquids to effect proper mixing.

It is a further object of this invention to provide a container or receptacle as just set forth in which the container proper is provided with a sealing component in the form of a raceway or groove having flexible walls that extend in U-shaped form down opposite inner sides and across the bottom of the container to receive in sealing relationship a partition member having apertured flanges extending from opposite sides thereof whereby different components can be accommodated in separate condition and reciprocation of the partition member effects proper mixing.

It is another object to provide an improved closure for the container that includes a snap fit locking arrangement with the container body and a slot having an integral feather edge seal around its edges to seal against the upper end of the partition.

The invention has for a further object to provide a container for separately receiving an epoxy resin, a catalyst or curing agent therefor and a roll of tape or cloth including means for mixing the resin and catalyst when desired and further means to allow the mixture to impregnate the tape or cloth prior to dispensing the same.

Further and more specific objects and advantages will be readily apparent from the following description taken in connection with the accompanying drawings in which:

FIGURE 1 is a front view of a container or package constructed in accordance with one form of the invention,

FIGURES 2 and 3, are respective top and side views thereof,

FIGURE 4 is a fragmentary cross-sectional view taken along lines **4—4** of FIGURE 1,

FIGURE 4*a* is a similar view illustrating a modified partition structure,

FIGURE 5 is a similar view taken along lines **5—5** of FIGURE 3,

FIGURE 6 is a fragmentary cross-sectional view illustrating the partition receiving raceway or groove,

FIGURE 7 is a view similar to FIGURE 3 but illustrating the invention as applied to a round container,

FIGURE 8 is a front view of a modified resin-catalyst container embodying the invention and including a reel of cloth that can be impregnated with the resin-catalyst mixture prior to dispensing thereof,

FIGURE 9 is a fragmentary cross-sectional view taken along lines **9—9** of FIGURE 8,

FIGURE 10 is a vertical sectional view taken along lines **10—10** of FIGURE 8,

FIGURE 11 is a fragmentary cross-sectional view taken along lines **11—11** of FIGURE 10.

The first embodiment of the invention includes four main components comprising a container body **1** which may be of any external configuration, a partition **2** to divide the body into two compartments, a cover or lid **3** that is a snap lock fit on the body and if desired a tamperproof cap **4**.

The container body is provided with a sealing groove or raceway **5** that has flexible lips or walls **6** to engage peripheral portions of the partition **2**. The side walls defining the raceway or groove may be shaped to provide a cavity **6'** and the periphery of the partition at least at the bottom thereof may be beaded as at **2'** to provide a stronger sealing relationship while still permitting reciprocation of the partition.

The upper edge of the container body has an external sealing bead **7** near the top thereof and beneath this bead is an external flange **8** that is undercut at **8'** to provide a locking bead.

The cover **3** has a depending rim portion **9** that has an internal groove **10** extending therearound. At spaced locations around the cover or bead enlarged portions **11** are provided that are shaped to constitute a depending locking tab **12**. The tabs **12** have an internal rib that is

undercut at 12' complemental to the undercut 8' on the flange 8 so that the lid can be snap fit on to the body. The resiliency of the plastic from which the container and lid are made ensures a tight fit and connection of the lid to the body.

The lid also has a partition accommodating slot 13 therein, the peripheral edges of which are shaped to provide a feather edge seal 13' against the partition. Further a knockout plug 14 is also provided in the container lid to permit dispensing of the mixed contents when desired.

The tamperproof or safety cover or cap 4 is shaped to fit over the upstanding handle portion of the partition and includes a peripheral flange that can be heat welded to the upper surface of the container lid or cover 3.

The partition includes an upper handle portion having a finger or hand hole 2'' therein and rounded upper edges for easy engagement through the slot 13 in the cover or lid 3.

Further the partition has flanges 15 extending from opposite sides thereof at a location above the lower peripheral edge of the partition. These flanges are notched at opposite ends as at 16 so as to clear the inwardly extending raceway 5. Additionally the flanges are provided with apertures 17 in staggered relationship on opposite sides of the partition. Depending beneath the apertures are flow directing lips or vanes 18 that act to cause the separated contents to flow toward one another when the partition is lifted, the vanes thus inducing currents transverse to the partition during reciprocation. It is believed clear that the partition-flange relationship provides a paddle or agitator to thoroughly mix the contents when the paddle is reciprocated within the container.

One example of an epoxy resin-catalyst mixture is 100 parts of a resin sold commercially under the designation GE RTV 11 to 1 part of a catalyst termed Thermolite 12. This mixture cures in 2 to 3 hours.

Any known and commercially available epoxy resin and catalyst combinations can be utilized. Also the combinations disclosed in U.S. Patent No. 3,080,341 dated Mar. 5, 1963, provide other examples.

As is known in the art the proportions of the ingredients can be varied to alter the setting or curing time.

The illustrated form of apertures in the flanges 15 are merely exemplary of one way to induce a transverse current flow when the partition is reciprocated. Another embodiment of the agitator paddle is one in which the flange portions 15' are somewhat thicker than illustrated and provided with apertures 18' that are disposed at an angle to the partition member such as shown in FIGURE 4*a*. These angled apertures can slant downwards and inwards toward the partition or upwards and inwards toward the partition as desired.

Further it is to be pointed out that while the illustrated partition arrangement divides the container body into a pair of equal area compartments it may be desired in some instances to have compartments of unequal area. Thus the sealing groove can be formed at any location along the inner sides of the container 2 that will provide compartments of the desired area.

In using the package of the aforedescribed form of the invention, the partition is inserted in the sealing groove and pressed down to ensure a tight connection with the bottom part of the groove. Then a desired amount of, for example, epoxy resin solution is poured into one compartment and the required amount of catalyst as curing agent solution is poured into the other compartment. The cover or lid is then slipped over the upper portion of the partition, the rounded corners of the partition facilitating this movement. The cover is pressed down and snapped in place over the locking flange. In this connection the feather edge around the slot in the cover seals against the partition. Then the tamperproof or safety cap is placed over the partition and heat welded or seamed to the cover. The package is now ready for shipment. It can be safely handled and stored until use. When it is desired to use the same the safety cap is cut and removed. The partition is reciprocated to thoroughly mix the contents and then the knock-out plug is removed and the mixed contents poured out for use.

The above described package is preferably made of sizes to provide pint and quart sized containers.

The second form of safety package for mixable liquids, preferably an epoxy resin and a catalyst or curing agent therefor includes some of the basic components of the first form of the invention. However this second form also includes a roll of tape or cloth of, for example, fiberglass that is to be impregnated with the mixed epoxy resin and curing agent or catalyst and then dispensed for use.

Thus as shown in FIGURE 10 the safety package includes a main container body structure 20 having walls defining two compartments or sections X and Z of different volume, a first partition 21 extending the full width is slidably mounted in a sealing raceway or groove 22 that separates these compartments, a second and tubular partition 23 having a lower end that seals in another sealing raceway or groove 24 that is of circular configuration. Further, the interior of the tubular partition 23 constitutes a chamber Y. There is a reel or roll of fiberglass tape or cloth 25 having mounting pintles 26 disposed in vertical grooves 27 in the side walls of compartment Z and having an end portion 28 of tab form that extends between guides or rolls 29 and through a dispensing slot 30 in the wall of compartment 2 opposite partition 21. The rolls 29 can have there pintles in grooves in the side walls with spaced members between the pintles and cover or lid. There is also included a first cover or lid 31 that closes compartment Z and a second cover or lid 32 having an aperture 33 and a slit 34 that accommodates the upper ends of partitions 21 and 23. The edges of both of the aperture 33 and slit or slot 34 are shaped to provide feather edge seals 33', 34' sealing against the respective partitions. The cover or lid 32 is a snap-fit cover having an undercut internal flange 35 to engage a complemental undercut external rim or flange 36 on the upper end of the walls defining the compartment X. The resiliency of the material from which the container is made permitting this snap fit relationship. A closure cap or handle 37 is in threaded engagement with the upper end of hollow partition 23 and removable tamperproof caps or safety covers 38 and 39 are welded or seamed to the cover 32. While separate covers 38 and 39 are illustrated a single such cover or cap could be provided.

The hollow partition has an external paddle 23' formed on its lower end above the edge portion that seals in the groove 24 in the base of compartment X. This paddle or agitator is provided with apertures 23'' that assist the mixing of the two liquid components when the partition 23 is reciprocated.

The base or bottom wall of the compartment X includes a dome-shaped portion at 40 to facilitate mixing. The base or bottom 41 of compartment 2 is arcuate or trough-shaped to better confine the mixture into a pool around at least a portion of the roll of fiberglass tape or cloth.

It is clear that the dimensions of the package can be varied to suit desired requirements and the width of the roll of tape or cloth can likewise be varied as desired. In general the tape will be 2, 3, 4, 5 or 6 inch widths and its length can vary from 3 yards to 6 yards.

In filling the safety package of the second embodiment, the partition 21 is first inserted in its U-shaped sealing groove to separate compartments X and Z. Then partition 23 is put in position and held down so that its lower edge seals in place in its sealing groove 24 to separate compartments X and Y. Thereafter the desired quantity of a first liquid such as epoxy resin solution is poured into compartment X. Then the cover or lid 31 is slipped over the upper ends of partitions 21 and 23, slid down the partitions and snapped in place on the con-

tainer body structure to close compartment X. Thereafter a required amount of catalyst or curing or hardening agent is poured into hollow partition **23** and its closure or cap **37** is threaded on the upper end of hollow partition **23**. The desired width roll of fiberglass tape or cloth is inserted in compartment Z with the tab-formed free end of such tape or cloth being passed between the guides **29** and through slot **30** in the wall of the container body. Then lid or cover **31** is snap fit in place and the tamperproof or safety caps **38** and **39** are applied over the upper ends of partitions **21** and **23**. The now filled package can be safely transported or stored until use.

This form of package finds ideal application in the field of military bandaging, the resin impregnated tape being suitable for use to form a splint in the field. When usage is desired the safety caps are cut or broken and removed. Partition **23** is reciprocated to effect thorough mixing of the catalyst and resin solutions. Then partition **21** is slid upwardly to allow the mixture to flow from compartment X into compartment Z. When the roll of tape has been impregnated it is withdrawn and applied in the required amount.

Also this form of the invention can be utilized in effecting repairs of damaged articles such as auto body parts, or in the boating field.

In both forms of the invention the components of the mixture are kept separated until they are to be mixed and used.

In the first form of the invention the mixture can be poured from the container and used as a coating composition if pigmented, as an adhesive base for tiles or the like, or as an impregnant for large areas of fiberglass cloth that is to be used in effecting repairs to auto bodies or boats.

While the component parts of the invention are preferably made of plastic it is believed clear that a metal or glass container body could be utilized and the slideway or sealing groove structure separately formed and secured internally of the container body. Further, other forms of snap fit cover arrangements can be utilized. Likewise the sealing grooves or raceways in the embodiment of FIGURES 8 to 10 can be formed with flexible lips if desired.

What is claimed is:

1. A safety package or container for mixable liquids such as epoxy resins and compatible catalytic agents comprising side and bottom wall means defining at least a main chamber having an open end, said wall means having a sealing groove structure on the interior thereof at least opposite said open end, at least one partition means having an edge structure removably insertable within said sealing groove structure and defining with said wall means at least two separate compartments, each adapted to accommodate a required amount of one of said solutions, at least one lid structure removably and sealably secured to said wall means and having at least one opening therein, said partition means including an extension passing through said opening and constituting a handle portion, means providing a seal between said opening and the adjacent portion of said extension while permitting reciprocation of said partition means within said chamber, and said partition means having an external paddle portion to facilitate mixing of the solutions in said chamber when said partition means is reciprocated.

2. A container as claimed in claim **1** and in which said external paddle portion is an apertured flange structure extending perpendicular to the partition means.

3. A container as claimed in claim **2** and flow deflecting portions embodied with the apertures in said apertured flange structure.

4. A container as claimed in claim **1** and a removable safety cap covering said handle portion and secured to said lid structure.

5. A container as claimed in claim **1** in which the means providing a seal between said opening in the lid structure and the adjacent portion of said extension of the partition means is a feather edge seal.

6. A container as claimed in claim **1** in which said side and bottom wall means defines two adjacent open ended compartments, said sealing groove structure comprising a first sealing groove of U-shaped cross section extending down the interior of opposite wall means and across the bottom between said compartments and a second and closed sealing groove of similar cross-section in the bottom wall means of one of said compartments, said partition means comprising a first partition means removably insertable within said first sealing groove to separate said two compartments and a second and tubular partition means removably insertable within said second sealing groove and defining with said first partition and portions of said side and said bottom wall means, two separate chambers in one of said compartments for containing said epoxy resin and catalytic agent solutions, said lid structure comprising a first lid removably and sealably secured to said wall means and having a slot and an opening therein, both of said partitions including extensions passing through said slot and opening respectively and constituting handle portions, a closure cap for said tubular partition, means providing a seal between said slot and opening and the adjacent portions of said partition extensions, while permitting reciprocation of said tubular partition and at least lifting of said first partition, and said tubular partition having said external paddle portion for facilitating mixing.

7. A container as defined in claim **6** in which the side wall opposite said first partition has a slot therein and a roll of cloth tape supported in said other compartment and having an end portion extending through said last mentioned slot, and a second lid structure removably closing said other compartment, whereby reciprocation of said tubular partition mixes said solutions and lifting of said first partition allows the mixture to enter said other compartment to impregnate said tape.

8. A container as claimed in claim **7** in which the bottom wall of said other compartment is below the level of the bottom wall of said one compartment whereby a pool of said mixture can form in said other compartment and said roll of tape being supported on said other compartment at a level such that it is at least partially immersed in said pool.

9. A container as claimed in claim **6** and a removable safety cap means covering the handle portions and secured to lid.

10. A container as claimed in claim **1** in which said partition means is a single partition, and a knockout portion in said lid structure to provide a dispensing opening for the mixture.

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U.S. Cl. X.R.

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